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15 October 1959

MEMORANDUM FOR: Special Assistant for Technical Analysis, DPD

SUBJECT : Possible Effects of Atmospheric Conditions in High Mach Numbers in Excess of 70,000 Feet

1. [redacted] DPD, has completed a discussion this date with Major Smith of Air Weather Service, and a part of the discussion presented in the context of possible improvements to the U-2 aircraft dealt with atmospheric conditions above 70,000 feet when encountered in conjunction with moderately high Mach numbers. 50X1

2. It was Major Smith's stated feeling that based upon AWS observations in this area a high Mach number aircraft might well encounter contrails above 70,000 feet as a result of friction and heating in the temperature range of minus 68 to minus 85 degrees Fahrenheit, which is the reported spread between 70,000 and 110,000 feet. I realize that we have all been concerned about the question of radar reflectivity and counterdevelopment for the sonic boom effect which presumably would accompany a high Mach number aircraft even at high altitude, but perhaps we should at least run to the ground and negatively verify any possibilities such as those to which I have alluded.

3. Major Smith also indicated that in his view there might be possible adverse effects upon the air frame and/or engine while passing at high speed through abrupt temperature inversions which reportedly cover a spectrum of 50 degrees Fahrenheit within a flight band of several hundred miles or 10 - 15 minutes of flying time. It may be possible that if this phenomenon exists it would be equivalent to encountering turbulence at a lower altitude in a more conventional aircraft. I should add that the question of temperature effect which could produce either contrails or apparent turbulence appears to be more of a problem in the winter months, particularly above the 65 degree North latitude, and hence perhaps less of a problem in any reconnaissance effort where sun angles dictate the season in which the mission is flown.

4. Your reactions and/or those of others on distribution for this memorandum would prove helpful.

SIGNED

JAMES A. CUNNINGHAM, JR.
Acting Chief, DPD-DD/P

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